DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 11/5/2007 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. It has been placed in the application file, but, to the extent the information referred to therein has been lined through, that information has not been considered.

Drawings

2. The drawings are objected to because 1) Figures 1, 4, 7, 10 and 11 contain so-called “black boxes” without labels describing the contents of the boxes, and 2) Figures 5 and 8 are graphs having axes that are not labeled. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief

description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The abstract of the disclosure is objected to because it is not a single paragraph. Correction is required. See MPEP § 608.01(b).

4. The specification is objected to for the following reasons. In paragraph no(s). [0061], with reference to Fig. 5B, the specification describes a “negative peak” as having the “largest” change. In contrast, with reference to Fig. 8B, paragraph no(s). [0072] describes a “positive peak” as having the "largest” change. It is believed that these opposing descriptions cannot both be correct. It is recommended that either 1) both of the foregoing descriptions be changed to describe that the absolute value of the change is the largest at the respective peaks; or, alternatively, 2) paragraph no(s). [0061] be changed to describe that the change is the smallest at the negative peak.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 10, line 4 of each, respectively, recite "forming a modified region within the object." It is unclear what applicant means by such statement. Appropriate correction and/or clarification are required.

The term "an extreme value" in claim 14, line 6, is a relative term which renders the claim indefinite. The term "extreme" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. For the purpose of substantive examination, this recitation is interpreted as a recitation of “a maximum value.”

Claims 1, 7-10 and 16-18 recite, respectively, releasing the lens, the lens is released, and release the lens “from being held.” It is unclear whether releasing the lens from being held means releasing the lens from being secured against falling by the force of gravity or releasing the holding means from being fixed in a given position. For the purpose of substantive examination, these recitations are interpreted as recitations of releasing a/the holding means from being fixed in a given position.

The scope of claims 5 and 6, respectively, is unclear for the reason that these claims appear to be identical in scope.

Claims 8 and 17 recite, in lines 3-4 of each, respectively, "an amount of change in the quantity of reflected light becomes a maximum value." Similarly, claim 14 recites, in lines 5-6, "an amount of change in the acquired quantity of light becomes an extreme [i.e. maximum] value." It is unclear whether the extreme/maximum value applies to the absolute value of the amount of change (i.e. the maximum magnitude regardless of sign), or only to an amount of change having an increasing, i.e. positive, slope. For the purpose of substantive examination, these recitations are interpreted as recitations of "a maximum absolute value."

Claims 2-4, 11-13 and 15 are included in this rejection based upon their dependence, either directly or indirectly, from one or more of claims 1 and 10, respectively.

Double Patenting

6. Claims 1-18 are directed to an invention not patentably distinct from claims 1-3 of commonly assigned U.S. Patent No. 7,595,895 (hereinafter "795"). Accordingly, pursuant to MPEP 804 Chart II-B, Applicant is required to either (a) name the first inventor of conflicting subject matter under 102(f) or 102(g), or (b) show that the inventions were commonly owned at the time of Applicant's invention.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1-7, 9-13, 15, 16 and 18 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 2 of U.S. Patent No. 7,595,895 in view of EP 1 338 371 A1 to Fukuyo et al. (hereinafter "Fukuyo") in view of U.S. Pat. App. Pub. No. 2002/0153500 to Fordahl et al. (hereinafter "Fordahl"). To the extent that claims 1 and 2 of U.S. Patent No. 7,595,895 do not alone recite the patentably indistinct equivalent of the subject matter recited in the rejected claims, that subject matter is disclosed taught and suggested by the secondary references as described below.

Regarding claim 1, Fukuyo discloses a laser processing method for irradiating an object to be processed with a first laser beam **(paragraph no(s). [0006], et seq.)** while converging the first laser beam with a lens **(paragraph no(s). [0051], et seq.)** such that a converging point is positioned within the object **(paragraph no(s). [0009], et seq.)**, and forming a modified region within the object along a line to cut in the object **(paragraph no(s). [0072], et seq.)**; the method comprising: a displacement acquiring step of acquiring a displacement between a point on the line to cut and one end of the line to cut **(paragraph no(s). [0162], et seq.)** while irradiating the object with a second light beam **(paragraph no(s). [0142], et seq.)** for measuring a displacement of a main surface of the object **(paragraph no(s). [0162], et seq.)** and detecting light reflected by the main surface in response to the irradiation **(paragraph no(s). [0142]-[0145], et seq.)**, and a processing step of forming the modified region in one end part of the line to cut upon irradiation with the first laser beam while holding the lens at the initial position

(paragraph no(s). [0072], et seq.), and then forming the modified region **(paragraph no(s). [0165], et seq.)**.

Regarding claim 2, Fukuyo discloses wherein the second light beam is emitted without emitting the first laser beam in the displacement acquiring step **(paragraph no(s). [0148]-[0151], et seq.)**.

Regarding claim 4, Fukuyo discloses wherein the displacement is acquired from a point on the line to cut toward one end of the line to cut in the displacement acquiring step **(paragraph no(s). [0162], et seq.)**.

Regarding claims 5 and 6, Fukuyo discloses wherein the quantity of reflected light of the second laser beam is also acquired in the displacement acquiring step **(paragraph no(s). [0142]-[0145], et seq.)**.

Regarding claim 10, Fukuyo discloses **(Figs. 1-6, 14, e.g.)** a laser processing apparatus **(100)** for irradiating an object to be processed **(1)** with a first laser beam **(L)** while converging the first laser beam **(paragraph no(s). [0006], [0051], et seq.)** with a lens **(105)** such that a converging point **(P)** is positioned within the object, and forming a modified region **(7)** within the object along a line to cut **(5)** in the object **(paragraph no(s). [0072], et seq.)**; the apparatus comprising: a lens **(105)** for converging the first laser beam **(L)** and a second light beam for measuring a displacement of a main surface of the object onto the object **(paragraph no(s). [0142], [0162], et seq.)**; displacement acquiring means **(0125)** for acquiring the displacement of the main surface **(paragraph no(s). [0142], [0162], et seq.)** by detecting light reflected by the main surface in response to the irradiation **(paragraph no(s). [0143])**; wherein, the

control means controls the moving means so as to move the object and the lens relative to each other along the line to cut **(paragraph no(s). [0072], [0165], et seq.)**, the displacement acquiring means acquiring the displacement between a point of the line to cut and one end of the line to cut **(paragraph no(s). [0162], et seq.)**, an initial position set according to the acquired displacement **(paragraph no(s). [0144], et seq.)**; wherein, while emitting the first laser beam with the lens being held at the initial position, the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut, thereby forming the modified region in one end part of the line to cut **(paragraph no(s). [0072], [0165], et seq.)**.

Regarding claim 11, Fukuyo discloses wherein the second laser beam is emitted without emitting the first laser beam when the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut while the displacement acquiring means acquires the displacement between a point of the line to cut and one end of the line to cut **(paragraph no(s). [0148]-[0151], et seq.)**.

Regarding claim 15, Fukuyo discloses wherein the displacement acquiring means also acquires the quantity of reflected light of the second laser beam **(paragraph no(s). [0142]-[0145], et seq.)**.

Regarding claim 1, Fukuyo fails to disclose, teach or suggest that the second light beam is a laser beam; a position setting step of setting an initial position for holding the lens with respect to the main surface of the object according to the acquired displacement; releasing the lens from being held at the initial position after forming the

modified region in the one end part; and that the modified region is formed while adjusting the position of the lens.

Regarding claim 10, Fukuyo fails to disclose, teach or suggest that the second light beam is a laser beam; moving means for moving the object and the lens relative to each other along the main surface while emitting the second light beam; holding means for holding the lens such that the lens freely advances and retracts with respect to the main surface; the control means controlling the holding means so as to hold the lens; and wherein, after forming the modified region in the one end part, the control means controls the holding means so as to release the lens from being held at the initial position and hold the lens while adjusting a position of the lens, and controls the moving means so as to move the object and the lens relative to each other along the line to cut.

Regarding claim 15, Fukuyo fails to disclose, teach or suggest wherein the control means sets the initial position according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold.

Regarding claims 3, 5-7, 9, 12, 13, 16 and 18, Fukuyo fails to disclose, teach or suggest the subject matter recited therein.

Regarding claim 1, Fordahl discloses that the second light beam **(40)** is a laser beam **(paragraph no(s). [0022])**; a position setting step of setting an initial position for holding the lens with respect to the main surface of the object according to the acquired displacement **(paragraph no(s). [0026])**; releasing the lens from being held at the initial position **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and adjusting the position of the lens **(36, also interpreted to be a component**

of black boxed "focusing element 35") while operating the first laser **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**.

Regarding claims 3 and 12, Fordahl discloses wherein the first and second laser beams are converged by the lens so as to irradiate the object on the same axis **(paragraph no(s). [0013])**.

Regarding claims 5 and 6, Fordahl discloses wherein the initial position is set according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold in the position setting step **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 7, Fordahl discloses wherein, in the processing step, the second laser beam is emitted to the main surface of the object to be processed, and the lens is released from being held at the initial position according to the quantity of reflected light reflected by the main surface in response to the emission **(paragraph no(s). [0024]-[0026])**.

Regarding claim 9, Fordahl discloses wherein, in the processing step, the lens is released from being held at the initial position after the quantity of reflected light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 10, Fordahl discloses **(Figs. 2-4, 6, 7)** that the second light beam **(40)** is a laser beam **(paragraph no(s). [0022])**; moving means **(82)** for moving the object **(28)** and the lens **(36)** relative to each other along the main surface **(26)** while emitting the second laser beam **(paragraph no(s). [0031], [0032], [0034], contrast**

[0036]); holding means **(82)** for holding the lens **(also interpreted to be a component of black boxed "focusing element 35")** such that the lens freely advances and retracts with respect to the main surface **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and control means **(85)** for controlling respective behaviors of the moving means and holding means **(paragraph no(s). [0031], [0032], [0034])**; the control means controlling the holding means so as to hold the lens **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and wherein, the control means controls the holding means so as to release the lens from being held at the initial position and hold the lens while adjusting a position of the lens **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**, and controls the moving means so as to move the object and the lens relative to each other along the line to cut **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**.

Regarding claim 13, Fordahl discloses wherein the control means controls the moving means so as to irradiate the line to cut from a point thereof toward one end thereof with the second laser beam **(paragraph no(s). [0034])**; and wherein the displacement acquiring means acquires the displacement from the point on the line to cut toward the one end of the line to cut in response to the irradiation with the second laser beam **(paragraph no(s). [0024]-[0026])**.

Regarding claim 15, Fordahl discloses wherein the control means sets the initial position according to the displacement at a location where the acquired quantity of light

becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 16, Fordahl discloses wherein the control means controls the holding means so as to release the lens from being held at the initial position according to the quantity of reflected light of the second laser beam **(paragraph no(s). [0024]-[0026])**.

Regarding claim 18, Fordahl discloses wherein the control means controls the holding means so as to release the lens from being held at the initial position after the quantity of reflected light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Fordahl discloses a device from the same field of endeavor as the subject matter of the application, wherein the lens moves according to specified control functions and predetermined thresholds as described above. It would have been obvious to a person having an ordinary level of skill in the art at the time the invention was made to include the lens movement and control functions disclosed by Fordahl with the method and apparatus disclosed by Fukuyo, such that the movement of the lens occurs after forming the modified region in the one end part, in order to keep the measurement beam operational during machining operations **(Fordahl at paragraph no(s). [0005])**.

8. Claims 8, 14 and 17 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 2 of U.S. Patent No. 7,595,895 in view of EP 1 338 371 A1 to Fukuyo et al. (hereinafter "Fukuyo") in view of

U.S. Pat. App. Pub. No. 2002/0153500 to Fordahl et al. (hereinafter "Fordahl"), and further in view of U.S. Patent No. 5,122,648 to Cohen et al. (hereinafter "Cohen"). To the extent that claims 1 and 2 of U.S. Patent No. 7,595,895 do not alone recite the patentably indistinct equivalent of the subject matter recited in the rejected claims, that subject matter is disclosed taught and suggested by the secondary references as described below.

Fukuyo and Fordahl show all the features of the claimed invention as set forth above, including releasing of the lens from the initial position in the processing step, wherein the displacement acquiring means also acquires the quantity of reflected light of the second laser beam; wherein the control means sets the initial position according to the displacement at a location; and wherein the control means controls the holding means so as to release the lens from being held at the initial position. The combination of Fukuyo and Fordahl fails to disclose, teach or suggest that the control thresholds for these functions is after an amount of change in the quantity of reflected light becomes a maximum or extreme value. Cohen discloses control after an amount of change in the quantity of reflected light becomes a maximum or extreme value **(col. 10, lines 54-61)**.

Cohen discloses a device from the same field of endeavor as the subject matter of the application, wherein the control threshold is when a quantity of reflected light becomes a maximum or extreme value. It would have been obvious to a person having an ordinary level of skill in the art at the time the invention was made to replace the control thresholds disclosed by the combination of Fukuyo and Fordahl with the control

threshold(s) disclosed by Cohen in order "to effectuate automatic focusing" **(Cohen at col. 10, lines 46-50)**.

9. Claims 1-7, 9-13, 15, 16 and 18 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-14 of copending Application No. 10/585,343 in view of EP 1 338 371 A1 to Fukuyo et al. (hereinafter "Fukuyo") in view of U.S. Pat. App. Pub. No. 2002/0153500 to Fordahl et al. (hereinafter "Fordahl"). To the extent that claims 1-14 of copending Application No. 10/585,343 do not alone recite the patentably indistinct equivalent of the subject matter recited in the rejected claims, that subject matter is disclosed taught and suggested by the secondary references as described below.

Regarding claim 1, Fukuyo discloses a laser processing method for irradiating an object to be processed with a first laser beam **(paragraph no(s). [0006], et seq.)** while converging the first laser beam with a lens **(paragraph no(s). [0051], et seq.)** such that a converging point is positioned within the object **(paragraph no(s). [0009], et seq.)**, and forming a modified region within the object along a line to cut in the object **(paragraph no(s). [0072], et seq.)**; the method comprising: a displacement acquiring step of acquiring a displacement between a point on the line to cut and one end of the line to cut **(paragraph no(s). [0162], et seq.)** while irradiating the object with a second light beam **(paragraph no(s). [0142], et seq.)** for measuring a displacement of a main surface of the object **(paragraph no(s). [0162], et seq.)** and detecting light reflected by the main surface in response to the irradiation **(paragraph no(s). [0142]-[0145], et**

seq.), and a processing step of forming the modified region in one end part of the line to cut upon irradiation with the first laser beam while holding the lens at the initial position **(paragraph no(s). [0072], et seq.)**, and then forming the modified region **(paragraph no(s). [0165], et seq.)**.

Regarding claim 2, Fukuyo discloses wherein the second light beam is emitted without emitting the first laser beam in the displacement acquiring step **(paragraph no(s). [0148]-[0151], et seq.)**.

Regarding claim 4, Fukuyo discloses wherein the displacement is acquired from a point on the line to cut toward one end of the line to cut in the displacement acquiring step **(paragraph no(s). [0162], et seq.)**.

Regarding claims 5 and 6, Fukuyo discloses wherein the quantity of reflected light of the second laser beam is also acquired in the displacement acquiring step **(paragraph no(s). [0142]-[0145], et seq.)**.

Regarding claim 10, Fukuyo discloses **(Figs. 1-6, 14, e.g.)** a laser processing apparatus **(100)** for irradiating an object to be processed **(1)** with a first laser beam **(L)** while converging the first laser beam **(paragraph no(s). [0006], [0051], et seq.)** with a lens **(105)** such that a converging point **(P)** is positioned within the object, and forming a modified region **(7)** within the object along a line to cut **(5)** in the object **(paragraph no(s). [0072], et seq.)**; the apparatus comprising: a lens **(105)** for converging the first laser beam **(L)** and a second light beam for measuring a displacement of a main surface of the object onto the object **(paragraph no(s). [0142], [0162], et seq.)**; displacement acquiring means **(0125)** for acquiring the displacement of the main

surface **(paragraph no(s). [0142], [0162], et seq.)** by detecting light reflected by the main surface in response to the irradiation **(paragraph no(s). [0143])**; wherein, the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut **(paragraph no(s). [0072], [0165], et seq.)**, the displacement acquiring means acquiring the displacement between a point of the line to cut and one end of the line to cut **(paragraph no(s). [0162], et seq.)**, an initial position set according to the acquired displacement **(paragraph no(s). [0144], et seq.)**; wherein, while emitting the first laser beam with the lens being held at the initial position, the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut, thereby forming the modified region in one end part of the line to cut **(paragraph no(s). [0072], [0165], et seq.)**.

Regarding claim 11, Fukuyo discloses wherein the second laser beam is emitted without emitting the first laser beam when the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut while the displacement acquiring means acquires the displacement between a point of the line to cut and one end of the line to cut **(paragraph no(s). [0148]-[0151], et seq.)**.

Regarding claim 15, Fukuyo discloses wherein the displacement acquiring means also acquires the quantity of reflected light of the second laser beam **(paragraph no(s). [0142]-[0145], et seq.)**.

Regarding claim 1, Fukuyo fails to disclose, teach or suggest that the second light beam is a laser beam; a position setting step of setting an initial position for holding the lens with respect to the main surface of the object according to the acquired

displacement; releasing the lens from being held at the initial position after forming the modified region in the one end part; and that the modified region is formed while adjusting the position of the lens.

Regarding claim 10, Fukuyo fails to disclose, teach or suggest that the second light beam is a laser beam; moving means for moving the object and the lens relative to each other along the main surface while emitting the second light beam; holding means for holding the lens such that the lens freely advances and retracts with respect to the main surface; the control means controlling the holding means so as to hold the lens; and wherein, after forming the modified region in the one end part, the control means controls the holding means so as to release the lens from being held at the initial position and hold the lens while adjusting a position of the lens, and controls the moving means so as to move the object and the lens relative to each other along the line to cut.

Regarding claim 15, Fukuyo fails to disclose, teach or suggest wherein the control means sets the initial position according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold.

Regarding claims 3, 5-7, 9, 12, 13, 16 and 18, Fukuyo fails to disclose, teach or suggest the subject matter recited therein.

Regarding claim 1, Fordahl discloses that the second light beam **(40)** is a laser beam **(paragraph no(s). [0022])**; a position setting step of setting an initial position for holding the lens with respect to the main surface of the object according to the acquired displacement **(paragraph no(s). [0026])**; releasing the lens from being held at the initial position **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast**

[0036]); and adjusting the position of the lens **(36, also interpreted to be a component of black boxed "focusing element 35")** while operating the first laser **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**.

Regarding claims 3 and 12, Fordahl discloses wherein the first and second laser beams are converged by the lens so as to irradiate the object on the same axis **(paragraph no(s). [0013])**.

Regarding claims 5 and 6, Fordahl discloses wherein the initial position is set according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold in the position setting step **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 7, Fordahl discloses wherein, in the processing step, the second laser beam is emitted to the main surface of the object to be processed, and the lens is released from being held at the initial position according to the quantity of reflected light reflected by the main surface in response to the emission **(paragraph no(s). [0024]-[0026])**.

Regarding claim 9, Fordahl discloses wherein, in the processing step, the lens is released from being held at the initial position after the quantity of reflected light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 10, Fordahl discloses **(Figs. 2-4, 6, 7)** that the second light beam **(40)** is a laser beam **(paragraph no(s). [0022])**; moving means **(82)** for moving the object **(28)** and the lens **(36)** relative to each other along the main surface **(26)** while

emitting the second laser beam **(paragraph no(s). [0031], [0032], [0034], contrast [0036])**; holding means **(82)** for holding the lens **(also interpreted to be a component of black boxed "focusing element 35")** such that the lens freely advances and retracts with respect to the main surface **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and control means **(85)** for controlling respective behaviors of the moving means and holding means **(paragraph no(s). [0031], [0032], [0034])**; the control means controlling the holding means so as to hold the lens **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and wherein, the control means controls the holding means so as to release the lens from being held at the initial position and hold the lens while adjusting a position of the lens **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**, and controls the moving means so as to move the object and the lens relative to each other along the line to cut **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**.

Regarding claim 13, Fordahl discloses wherein the control means controls the moving means so as to irradiate the line to cut from a point thereof toward one end thereof with the second laser beam **(paragraph no(s). [0034])**; and wherein the displacement acquiring means acquires the displacement from the point on the line to cut toward the one end of the line to cut in response to the irradiation with the second laser beam **(paragraph no(s). [0024]-[0026])**.

Regarding claim 15, Fordahl discloses wherein the control means sets the initial position according to the displacement at a location where the acquired quantity of light

becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 16, Fordahl discloses wherein the control means controls the holding means so as to release the lens from being held at the initial position according to the quantity of reflected light of the second laser beam **(paragraph no(s). [0024]-[0026])**.

Regarding claim 18, Fordahl discloses wherein the control means controls the holding means so as to release the lens from being held at the initial position after the quantity of reflected light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Fordahl discloses a device from the same field of endeavor as the subject matter of the application, wherein the lens moves according to specified control functions and predetermined thresholds as described above. It would have been obvious to a person having an ordinary level of skill in the art at the time the invention was made to include the lens movement and control functions disclosed by Fordahl with the method and apparatus disclosed by Fukuyo, such that the movement of the lens occurs after forming the modified region in the one end part, in order to keep the measurement beam operational during machining operations **(Fordahl at paragraph no(s). [0005])**.

This is a provisional obviousness-type double patenting rejection.

10. Claims 8, 14 and 17 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-14 of

copending Application No. 10/585,343 in view of EP 1 338 371 A1 to Fukuyo et al. (hereinafter "Fukuyo") in view of U.S. Pat. App. Pub. No. 2002/0153500 to Fordahl et al. (hereinafter "Fordahl"), and further in view of U.S. Patent No. 5,122,648 to Cohen et al. (hereinafter "Cohen"). To the extent that claims 1-14 of copending Application No. 10/585,343 do not alone recite the patentably indistinct equivalent of the subject matter recited in the rejected claims, that subject matter is disclosed taught and suggested by the secondary references as described below.

Fukuyo and Fordahl show all the features of the claimed invention as set forth above, including releasing of the lens from the initial position in the processing step, wherein the displacement acquiring means also acquires the quantity of reflected light of the second laser beam; wherein the control means sets the initial position according to the displacement at a location; and wherein the control means controls the holding means so as to release the lens from being held at the initial position. The combination of Fukuyo and Fordahl fails to disclose, teach or suggest that the control thresholds for these functions is after an amount of change in the quantity of reflected light becomes a maximum or extreme value. Cohen discloses control after an amount of change in the quantity of reflected light becomes a maximum or extreme value **(col. 10, lines 54-61)**.

Cohen discloses a device from the same field of endeavor as the subject matter of the application, wherein the control threshold is when a quantity of reflected light becomes a maximum or extreme value. It would have been obvious to a person having an ordinary level of skill in the art at the time the invention was made to replace the control thresholds disclosed by the combination of Fukuyo and Fordahl with the control

threshold(s) disclosed by Cohen in order "to effectuate automatic focusing" **(Cohen at col. 10, lines 46-50)**.

This is a provisional obviousness-type double patenting rejection.

11. Claims 1-7, 9-13, 15, 16 and 18 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 2-7 and 9-26 of copending Application No. 10/585,451 in view of EP 1 338 371 A1 to Fukuyo et al. (hereinafter "Fukuyo") in view of U.S. Pat. App. Pub. No. 2002/0153500 to Fordahl et al. (hereinafter "Fordahl"). To the extent that claims 2-7 and 9-26 of copending Application No. 10/585,451 do not alone recite the patentably indistinct equivalent of the subject matter recited in the rejected claims, that subject matter is disclosed taught and suggested by the secondary references as described below.

Regarding claim 1, Fukuyo discloses a laser processing method for irradiating an object to be processed with a first laser beam **(paragraph no(s). [0006], et seq.)** while converging the first laser beam with a lens **(paragraph no(s). [0051], et seq.)** such that a converging point is positioned within the object **(paragraph no(s). [0009], et seq.)**, and forming a modified region within the object along a line to cut in the object **(paragraph no(s). [0072], et seq.)**; the method comprising: a displacement acquiring step of acquiring a displacement between a point on the line to cut and one end of the line to cut **(paragraph no(s). [0162], et seq.)** while irradiating the object with a second light beam **(paragraph no(s). [0142], et seq.)** for measuring a displacement of a main surface of the object **(paragraph no(s). [0162], et seq.)** and detecting light reflected by

the main surface in response to the irradiation **(paragraph no(s). [0142]-[0145], et seq.)**, and a processing step of forming the modified region in one end part of the line to cut upon irradiation with the first laser beam while holding the lens at the initial position **(paragraph no(s). [0072], et seq.)**, and then forming the modified region **(paragraph no(s). [0165], et seq.)**.

Regarding claim 2, Fukuyo discloses wherein the second light beam is emitted without emitting the first laser beam in the displacement acquiring step **(paragraph no(s). [0148]-[0151], et seq.)**.

Regarding claim 4, Fukuyo discloses wherein the displacement is acquired from a point on the line to cut toward one end of the line to cut in the displacement acquiring step **(paragraph no(s). [0162], et seq.)**.

Regarding claims 5 and 6, Fukuyo discloses wherein the quantity of reflected light of the second laser beam is also acquired in the displacement acquiring step **(paragraph no(s). [0142]-[0145], et seq.)**.

Regarding claim 10, Fukuyo discloses **(Figs. 1-6, 14, e.g.)** a laser processing apparatus **(100)** for irradiating an object to be processed **(1)** with a first laser beam **(L)** while converging the first laser beam **(paragraph no(s). [0006], [0051], et seq.)** with a lens **(105)** such that a converging point **(P)** is positioned within the object, and forming a modified region **(7)** within the object along a line to cut **(5)** in the object **(paragraph no(s). [0072], et seq.)**; the apparatus comprising: a lens **(105)** for converging the first laser beam **(L)** and a second light beam for measuring a displacement of a main surface of the object onto the object **(paragraph no(s). [0142], [0162], et seq.)**;

displacement acquiring means **(0125)** for acquiring the displacement of the main surface **(paragraph no(s). [0142], [0162], et seq.)** by detecting light reflected by the main surface in response to the irradiation **(paragraph no(s). [0143])**; wherein, the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut **(paragraph no(s). [0072], [0165], et seq.)**, the displacement acquiring means acquiring the displacement between a point of the line to cut and one end of the line to cut **(paragraph no(s). [0162], et seq.)**, an initial position set according to the acquired displacement **(paragraph no(s). [0144], et seq.)**; wherein, while emitting the first laser beam with the lens being held at the initial position, the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut, thereby forming the modified region in one end part of the line to cut **(paragraph no(s). [0072], [0165], et seq.)**.

Regarding claim 11, Fukuyo discloses wherein the second laser beam is emitted without emitting the first laser beam when the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut while the displacement acquiring means acquires the displacement between a point of the line to cut and one end of the line to cut **(paragraph no(s). [0148]-[0151], et seq.)**.

Regarding claim 15, Fukuyo discloses wherein the displacement acquiring means also acquires the quantity of reflected light of the second laser beam **(paragraph no(s). [0142]-[0145], et seq.)**.

Regarding claim 1, Fukuyo fails to disclose, teach or suggest that the second light beam is a laser beam; a position setting step of setting an initial position for holding

the lens with respect to the main surface of the object according to the acquired displacement; releasing the lens from being held at the initial position after forming the modified region in the one end part; and that the modified region is formed while adjusting the position of the lens.

Regarding claim 10, Fukuyo fails to disclose, teach or suggest that the second light beam is a laser beam; moving means for moving the object and the lens relative to each other along the main surface while emitting the second light beam; holding means for holding the lens such that the lens freely advances and retracts with respect to the main surface; the control means controlling the holding means so as to hold the lens; and wherein, after forming the modified region in the one end part, the control means controls the holding means so as to release the lens from being held at the initial position and hold the lens while adjusting a position of the lens, and controls the moving means so as to move the object and the lens relative to each other along the line to cut.

Regarding claim 15, Fukuyo fails to disclose, teach or suggest wherein the control means sets the initial position according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold.

Regarding claims 3, 5-7, 9, 12, 13, 16 and 18, Fukuyo fails to disclose, teach or suggest the subject matter recited therein.

Regarding claim 1, Fordahl discloses that the second light beam **(40)** is a laser beam **(paragraph no(s). [0022])**; a position setting step of setting an initial position for holding the lens with respect to the main surface of the object according to the acquired displacement **(paragraph no(s). [0026])**; releasing the lens from being held at the initial

position **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and adjusting the position of the lens **(36, also interpreted to be a component of black boxed "focusing element 35")** while operating the first laser **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**.

Regarding claims 3 and 12, Fordahl discloses wherein the first and second laser beams are converged by the lens so as to irradiate the object on the same axis **(paragraph no(s). [0013])**.

Regarding claims 5 and 6, Fordahl discloses wherein the initial position is set according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold in the position setting step **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 7, Fordahl discloses wherein, in the processing step, the second laser beam is emitted to the main surface of the object to be processed, and the lens is released from being held at the initial position according to the quantity of reflected light reflected by the main surface in response to the emission **(paragraph no(s). [0024]-[0026])**.

Regarding claim 9, Fordahl discloses wherein, in the processing step, the lens is released from being held at the initial position after the quantity of reflected light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 10, Fordahl discloses **(Figs. 2-4, 6, 7)** that the second light beam **(40)** is a laser beam **(paragraph no(s). [0022])**; moving means **(82)** for moving

the object **(28)** and the lens **(36)** relative to each other along the main surface **(26)** while emitting the second laser beam **(paragraph no(s). [0031], [0032], [0034], contrast [0036])**; holding means **(82)** for holding the lens **(also interpreted to be a component of black boxed "focusing element 35")** such that the lens freely advances and retracts with respect to the main surface **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and control means **(85)** for controlling respective behaviors of the moving means and holding means **(paragraph no(s). [0031], [0032], [0034])**; the control means controlling the holding means so as to hold the lens **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and wherein, the control means controls the holding means so as to release the lens from being held at the initial position and hold the lens while adjusting a position of the lens **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**, and controls the moving means so as to move the object and the lens relative to each other along the line to cut **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**.

Regarding claim 13, Fordahl discloses wherein the control means controls the moving means so as to irradiate the line to cut from a point thereof toward one end thereof with the second laser beam **(paragraph no(s). [0034])**; and wherein the displacement acquiring means acquires the displacement from the point on the line to cut toward the one end of the line to cut in response to the irradiation with the second laser beam **(paragraph no(s). [0024]-[0026])**.

Regarding claim 15, Fordahl discloses wherein the control means sets the initial position according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 16, Fordahl discloses wherein the control means controls the holding means so as to release the lens from being held at the initial position according to the quantity of reflected light of the second laser beam **(paragraph no(s). [0024]-[0026])**.

Regarding claim 18, Fordahl discloses wherein the control means controls the holding means so as to release the lens from being held at the initial position after the quantity of reflected light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Fordahl discloses a device from the same field of endeavor as the subject matter of the application, wherein the lens moves according to specified control functions and predetermined thresholds as described above. It would have been obvious to a person having an ordinary level of skill in the art at the time the invention was made to include the lens movement and control functions disclosed by Fordahl with the method and apparatus disclosed by Fukuyo, such that the movement of the lens occurs after forming the modified region in the one end part, in order to keep the measurement beam operational during machining operations **(Fordahl at paragraph no(s). [0005])**.

This is a provisional obviousness-type double patenting rejection.

12. Claims 8, 14 and 17 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 2-7 and 9-26 of copending Application No. 10/585,451 in view of EP 1 338 371 A1 to Fukuyo et al. (hereinafter "Fukuyo") in view of U.S. Pat. App. Pub. No. 2002/0153500 to Fordahl et al. (hereinafter "Fordahl"), and further in view of U.S. Patent No. 5,122,648 to Cohen et al. (hereinafter "Cohen"). To the extent that claims 2-7 and 9-26 of copending Application No. 10/585,451 do not alone recite the patentably indistinct equivalent of the subject matter recited in the rejected claims, that subject matter is disclosed taught and suggested by the secondary references as described below.

Fukuyo and Fordahl show all the features of the claimed invention as set forth above, including releasing of the lens from the initial position in the processing step, wherein the displacement acquiring means also acquires the quantity of reflected light of the second laser beam; wherein the control means sets the initial position according to the displacement at a location; and wherein the control means controls the holding means so as to release the lens from being held at the initial position. The combination of Fukuyo and Fordahl fails to disclose, teach or suggest that the control thresholds for these functions is after an amount of change in the quantity of reflected light becomes a maximum or extreme value. Cohen discloses control after an amount of change in the quantity of reflected light becomes a maximum or extreme value **(col. 10, lines 54-61)**.

Cohen discloses a device from the same field of endeavor as the subject matter of the application, wherein the control threshold is when a quantity of reflected light becomes a maximum or extreme value. It would have been obvious to a person having

an ordinary level of skill in the art at the time the invention was made to replace the control thresholds disclosed by the combination of Fukuyo and Fordahl with the control threshold(s) disclosed by Cohen in order "to effectuate automatic focusing" **(Cohen at col. 10, lines 46-50)**.

This is a provisional obviousness-type double patenting rejection.

13. Claims 1-7, 9-13, 15, 16 and 18 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4 of copending Application No. 12/096,940 in view of EP 1 338 371 A1 to Fukuyo et al. (hereinafter "Fukuyo") in view of U.S. Pat. App. Pub. No. 2002/0153500 to Fordahl et al. (hereinafter "Fordahl"). To the extent that claims 1-4 of copending Application No. 12/096,940 do not alone recite the patentably indistinct equivalent of the subject matter recited in the rejected claims, that subject matter is disclosed taught and suggested by the secondary references as described below.

Regarding claim 1, Fukuyo discloses a laser processing method for irradiating an object to be processed with a first laser beam **(paragraph no(s). [0006], et seq.)** while converging the first laser beam with a lens **(paragraph no(s). [0051], et seq.)** such that a converging point is positioned within the object **(paragraph no(s). [0009], et seq.)**, and forming a modified region within the object along a line to cut in the object **(paragraph no(s). [0072], et seq.)**; the method comprising: a displacement acquiring step of acquiring a displacement between a point on the line to cut and one end of the line to cut **(paragraph no(s). [0162], et seq.)** while irradiating the object with a second

light beam **(paragraph no(s). [0142], et seq.)** for measuring a displacement of a main surface of the object **(paragraph no(s). [0162], et seq.)** and detecting light reflected by the main surface in response to the irradiation **(paragraph no(s). [0142]-[0145], et seq.)**, and a processing step of forming the modified region in one end part of the line to cut upon irradiation with the first laser beam while holding the lens at the initial position **(paragraph no(s). [0072], et seq.)**, and then forming the modified region **(paragraph no(s). [0165], et seq.)**.

Regarding claim 2, Fukuyo discloses wherein the second light beam is emitted without emitting the first laser beam in the displacement acquiring step **(paragraph no(s). [0148]-[0151], et seq.)**.

Regarding claim 4, Fukuyo discloses wherein the displacement is acquired from a point on the line to cut toward one end of the line to cut in the displacement acquiring step **(paragraph no(s). [0162], et seq.)**.

Regarding claims 5 and 6, Fukuyo discloses wherein the quantity of reflected light of the second laser beam is also acquired in the displacement acquiring step **(paragraph no(s). [0142]-[0145], et seq.)**.

Regarding claim 10, Fukuyo discloses **(Figs. 1-6, 14, e.g.)** a laser processing apparatus **(100)** for irradiating an object to be processed **(1)** with a first laser beam **(L)** while converging the first laser beam **(paragraph no(s). [0006], [0051], et seq.)** with a lens **(105)** such that a converging point **(P)** is positioned within the object, and forming a modified region **(7)** within the object along a line to cut **(5)** in the object **(paragraph no(s). [0072], et seq.)**; the apparatus comprising: a lens **(105)** for converging the first

laser beam **(L)** and a second light beam for measuring a displacement of a main surface of the object onto the object **(paragraph no(s). [0142], [0162], et seq.)**; displacement acquiring means **(0125)** for acquiring the displacement of the main surface **(paragraph no(s). [0142], [0162], et seq.)** by detecting light reflected by the main surface in response to the irradiation **(paragraph no(s). [0143])**; wherein, the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut **(paragraph no(s). [0072], [0165], et seq.)**, the displacement acquiring means acquiring the displacement between a point of the line to cut and one end of the line to cut **(paragraph no(s). [0162], et seq.)**, an initial position set according to the acquired displacement **(paragraph no(s). [0144], et seq.)**; wherein, while emitting the first laser beam with the lens being held at the initial position, the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut, thereby forming the modified region in one end part of the line to cut **(paragraph no(s). [0072], [0165], et seq.)**.

Regarding claim 11, Fukuyo discloses wherein the second laser beam is emitted without emitting the first laser beam when the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut while the displacement acquiring means acquires the displacement between a point of the line to cut and one end of the line to cut **(paragraph no(s). [0148]-[0151], et seq.)**.

Regarding claim 15, Fukuyo discloses wherein the displacement acquiring means also acquires the quantity of reflected light of the second laser beam **(paragraph no(s). [0142]-[0145], et seq.)**.

Regarding claim 1, Fukuyo fails to disclose, teach or suggest that the second light beam is a laser beam; a position setting step of setting an initial position for holding the lens with respect to the main surface of the object according to the acquired displacement; releasing the lens from being held at the initial position after forming the modified region in the one end part; and that the modified region is formed while adjusting the position of the lens.

Regarding claim 10, Fukuyo fails to disclose, teach or suggest that the second light beam is a laser beam; moving means for moving the object and the lens relative to each other along the main surface while emitting the second light beam; holding means for holding the lens such that the lens freely advances and retracts with respect to the main surface; the control means controlling the holding means so as to hold the lens; and wherein, after forming the modified region in the one end part, the control means controls the holding means so as to release the lens from being held at the initial position and hold the lens while adjusting a position of the lens, and controls the moving means so as to move the object and the lens relative to each other along the line to cut.

Regarding claim 15, Fukuyo fails to disclose, teach or suggest wherein the control means sets the initial position according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold.

Regarding claims 3, 5-7, 9, 12, 13, 16 and 18, Fukuyo fails to disclose, teach or suggest the subject matter recited therein.

Regarding claim 1, Fordahl discloses that the second light beam **(40)** is a laser beam **(paragraph no(s). [0022])**; a position setting step of setting an initial position for

holding the lens with respect to the main surface of the object according to the acquired displacement **(paragraph no(s). [0026])**; releasing the lens from being held at the initial position **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and adjusting the position of the lens **(36, also interpreted to be a component of black boxed "focusing element 35")** while operating the first laser **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**.

Regarding claims 3 and 12, Fordahl discloses wherein the first and second laser beams are converged by the lens so as to irradiate the object on the same axis **(paragraph no(s). [0013])**.

Regarding claims 5 and 6, Fordahl discloses wherein the initial position is set according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold in the position setting step **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 7, Fordahl discloses wherein, in the processing step, the second laser beam is emitted to the main surface of the object to be processed, and the lens is released from being held at the initial position according to the quantity of reflected light reflected by the main surface in response to the emission **(paragraph no(s). [0024]-[0026])**.

Regarding claim 9, Fordahl discloses wherein, in the processing step, the lens is released from being held at the initial position after the quantity of reflected light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 10, Fordahl discloses **(Figs. 2-4, 6, 7)** that the second light beam **(40)** is a laser beam **(paragraph no(s). [0022])**; moving means **(82)** for moving the object **(28)** and the lens **(36)** relative to each other along the main surface **(26)** while emitting the second laser beam **(paragraph no(s). [0031], [0032], [0034], contrast [0036])**; holding means **(82)** for holding the lens **(also interpreted to be a component of black boxed "focusing element 35")** such that the lens freely advances and retracts with respect to the main surface **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and control means **(85)** for controlling respective behaviors of the moving means and holding means **(paragraph no(s). [0031], [0032], [0034])**; the control means controlling the holding means so as to hold the lens **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and wherein, the control means controls the holding means so as to release the lens from being held at the initial position and hold the lens while adjusting a position of the lens **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**, and controls the moving means so as to move the object and the lens relative to each other along the line to cut **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**.

Regarding claim 13, Fordahl discloses wherein the control means controls the moving means so as to irradiate the line to cut from a point thereof toward one end thereof with the second laser beam **(paragraph no(s). [0034])**; and wherein the displacement acquiring means acquires the displacement from the point on the line to

cut toward the one end of the line to cut in response to the irradiation with the second laser beam **(paragraph no(s). [0024]-[0026])**.

Regarding claim 15, Fordahl discloses wherein the control means sets the initial position according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 16, Fordahl discloses wherein the control means controls the holding means so as to release the lens from being held at the initial position according to the quantity of reflected light of the second laser beam **(paragraph no(s). [0024]-[0026])**.

Regarding claim 18, Fordahl discloses wherein the control means controls the holding means so as to release the lens from being held at the initial position after the quantity of reflected light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Fordahl discloses a device from the same field of endeavor as the subject matter of the application, wherein the lens moves according to specified control functions and predetermined thresholds as described above. It would have been obvious to a person having an ordinary level of skill in the art at the time the invention was made to include the lens movement and control functions disclosed by Fordahl with the method and apparatus disclosed by Fukuyo, such that the movement of the lens occurs after forming the modified region in the one end part, in order to keep the measurement beam operational during machining operations **(Fordahl at paragraph no(s). [0005])**.

This is a provisional obviousness-type double patenting rejection.

14. Claims 8, 14 and 17 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4 of copending Application No. 12/096,940 in view of EP 1 338 371 A1 to Fukuyo et al. (hereinafter "Fukuyo") in view of U.S. Pat. App. Pub. No. 2002/0153500 to Fordahl et al. (hereinafter "Fordahl"), and further in view of U.S. Patent No. 5,122,648 to Cohen et al. (hereinafter "Cohen"). To the extent that claims 1-4 of copending Application No. 12/096,940 do not alone recite the patentably indistinct equivalent of the subject matter recited in the rejected claims, that subject matter is disclosed taught and suggested by the secondary references as described below.

Fukuyo and Fordahl show all the features of the claimed invention as set forth above, including releasing of the lens from the initial position in the processing step, wherein the displacement acquiring means also acquires the quantity of reflected light of the second laser beam; wherein the control means sets the initial position according to the displacement at a location; and wherein the control means controls the holding means so as to release the lens from being held at the initial position. The combination of Fukuyo and Fordahl fails to disclose, teach or suggest that the control thresholds for these functions is after an amount of change in the quantity of reflected light becomes a maximum or extreme value. Cohen discloses control after an amount of change in the quantity of reflected light becomes a maximum or extreme value **(col. 10, lines 54-61)**.

Cohen discloses a device from the same field of endeavor as the subject matter of the application, wherein the control threshold is when a quantity of reflected light becomes a maximum or extreme value. It would have been obvious to a person having an ordinary level of skill in the art at the time the invention was made to replace the control thresholds disclosed by the combination of Fukuyo and Fordahl with the control threshold(s) disclosed by Cohen in order "to effectuate automatic focusing" **(Cohen at col. 10, lines 46-50)**.

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. Claims 1-7, 9-13, 15, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 1 338 371 A1 to Fukuyo et al. (hereinafter "Fukuyo") in view of U.S. Pat. App. Pub. No. 2002/0153500 to Fordahl et al. (hereinafter "Fordahl").

Regarding claim 1, Fukuyo discloses a laser processing method for irradiating an object to be processed with a first laser beam **(paragraph no(s). [0006], et seq.)** while converging the first laser beam with a lens **(paragraph no(s). [0051], et seq.)** such that a converging point is positioned within the object **(paragraph no(s). [0009], et seq.)**,

and forming a modified region within the object along a line to cut in the object **(paragraph no(s). [0072], et seq.)**; the method comprising: a displacement acquiring step of acquiring a displacement between a point on the line to cut and one end of the line to cut **(paragraph no(s). [0162], et seq.)** while irradiating the object with a second light beam **(paragraph no(s). [0142], et seq.)** for measuring a displacement of a main surface of the object **(paragraph no(s). [0162], et seq.)** and detecting light reflected by the main surface in response to the irradiation **(paragraph no(s). [0142]-[0145], et seq.)**, and a processing step of forming the modified region in one end part of the line to cut upon irradiation with the first laser beam while holding the lens at the initial position **(paragraph no(s). [0072], et seq.)**, and then forming the modified region **(paragraph no(s). [0165], et seq.)**.

Regarding claim 2, Fukuyo discloses wherein the second light beam is emitted without emitting the first laser beam in the displacement acquiring step **(paragraph no(s). [0148]-[0151], et seq.)**.

Regarding claim 4, Fukuyo discloses wherein the displacement is acquired from a point on the line to cut toward one end of the line to cut in the displacement acquiring step **(paragraph no(s). [0162], et seq.)**.

Regarding claims 5 and 6, Fukuyo discloses wherein the quantity of reflected light of the second laser beam is also acquired in the displacement acquiring step **(paragraph no(s). [0142]-[0145], et seq.)**.

Regarding claim 10, Fukuyo discloses **(Figs. 1-6, 14, e.g.)** a laser processing apparatus **(100)** for irradiating an object to be processed **(1)** with a first laser beam **(L)**

while converging the first laser beam **(paragraph no(s). [0006], [0051], et seq.)** with a lens **(105)** such that a converging point **(P)** is positioned within the object, and forming a modified region **(7)** within the object along a line to cut **(5)** in the object **(paragraph no(s). [0072], et seq.)**; the apparatus comprising: a lens **(105)** for converging the first laser beam **(L)** and a second light beam for measuring a displacement of a main surface of the object onto the object **(paragraph no(s). [0142], [0162], et seq.)**; displacement acquiring means **(0125)** for acquiring the displacement of the main surface **(paragraph no(s). [0142], [0162], et seq.)** by detecting light reflected by the main surface in response to the irradiation **(paragraph no(s). [0143])**; wherein, the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut **(paragraph no(s). [0072], [0165], et seq.)**, the displacement acquiring means acquiring the displacement between a point of the line to cut and one end of the line to cut **(paragraph no(s). [0162], et seq.)**, an initial position set according to the acquired displacement **(paragraph no(s). [0144], et seq.)**; wherein, while emitting the first laser beam with the lens being held at the initial position, the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut, thereby forming the modified region in one end part of the line to cut **(paragraph no(s). [0072], [0165], et seq.)**.

Regarding claim 11, Fukuyo discloses wherein the second laser beam is emitted without emitting the first laser beam when the control means controls the moving means so as to move the object and the lens relative to each other along the line to cut while

the displacement acquiring means acquires the displacement between a point of the line to cut and one end of the line to cut **(paragraph no(s). [0148]-[0151], et seq.)**.

Regarding claim 15, Fukuyo discloses wherein the displacement acquiring means also acquires the quantity of reflected light of the second laser beam **(paragraph no(s). [0142]-[0145], et seq.)**.

Regarding claim 1, Fukuyo fails to disclose, teach or suggest that the second light beam is a laser beam; a position setting step of setting an initial position for holding the lens with respect to the main surface of the object according to the acquired displacement; releasing the lens from being held at the initial position after forming the modified region in the one end part; and that the modified region is formed while adjusting the position of the lens.

Regarding claim 10, Fukuyo fails to disclose, teach or suggest that the second light beam is a laser beam; moving means for moving the object and the lens relative to each other along the main surface while emitting the second light beam; holding means for holding the lens such that the lens freely advances and retracts with respect to the main surface; the control means controlling the holding means so as to hold the lens; and wherein, after forming the modified region in the one end part, the control means controls the holding means so as to release the lens from being held at the initial position and hold the lens while adjusting a position of the lens, and controls the moving means so as to move the object and the lens relative to each other along the line to cut.

Regarding claim 15, Fukuyo fails to disclose, teach or suggest wherein the control means sets the initial position according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold.

Regarding claims 3, 5-7, 9, 12, 13, 16 and 18, Fukuyo fails to disclose, teach or suggest the subject matter recited therein.

Regarding claim 1, Fordahl discloses that the second light beam **(40)** is a laser beam **(paragraph no(s). [0022])**; a position setting step of setting an initial position for holding the lens with respect to the main surface of the object according to the acquired displacement **(paragraph no(s). [0026])**; releasing the lens from being held at the initial position **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and adjusting the position of the lens **(36, also interpreted to be a component of black boxed "focusing element 35")** while operating the first laser **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**.

Regarding claims 3 and 12, Fordahl discloses wherein the first and second laser beams are converged by the lens so as to irradiate the object on the same axis **(paragraph no(s). [0013])**.

Regarding claims 5 and 6, Fordahl discloses wherein the initial position is set according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold in the position setting step **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 7, Fordahl discloses wherein, in the processing step, the second laser beam is emitted to the main surface of the object to be processed, and the lens is

released from being held at the initial position according to the quantity of reflected light reflected by the main surface in response to the emission **(paragraph no(s). [0024]-[0026])**.

Regarding claim 9, Fordahl discloses wherein, in the processing step, the lens is released from being held at the initial position after the quantity of reflected light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 10, Fordahl discloses **(Figs. 2-4, 6, 7)** that the second light beam **(40)** is a laser beam **(paragraph no(s). [0022])**; moving means **(82)** for moving the object **(28)** and the lens **(36)** relative to each other along the main surface **(26)** while emitting the second laser beam **(paragraph no(s). [0031], [0032], [0034], contrast [0036])**; holding means **(82)** for holding the lens **(also interpreted to be a component of black boxed "focusing element 35")** such that the lens freely advances and retracts with respect to the main surface **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and control means **(85)** for controlling respective behaviors of the moving means and holding means **(paragraph no(s). [0031], [0032], [0034])**; the control means controlling the holding means so as to hold the lens **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**; and wherein, the control means controls the holding means so as to release the lens from being held at the initial position and hold the lens while adjusting a position of the lens **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**, and controls the moving means so as to move the object and the lens relative

to each other along the line to cut **(paragraph no(s). [0015], [0019], [0020], [0031], [0032], [0034], contrast [0036])**.

Regarding claim 13, Fordahl discloses wherein the control means controls the moving means so as to irradiate the line to cut from a point thereof toward one end thereof with the second laser beam **(paragraph no(s). [0034])**; and wherein the displacement acquiring means acquires the displacement from the point on the line to cut toward the one end of the line to cut in response to the irradiation with the second laser beam **(paragraph no(s). [0024]-[0026])**.

Regarding claim 15, Fordahl discloses wherein the control means sets the initial position according to the displacement at a location where the acquired quantity of light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Regarding claim 16, Fordahl discloses wherein the control means controls the holding means so as to release the lens from being held at the initial position according to the quantity of reflected light of the second laser beam **(paragraph no(s). [0024]-[0026])**.

Regarding claim 18, Fordahl discloses wherein the control means controls the holding means so as to release the lens from being held at the initial position after the quantity of reflected light becomes a predetermined threshold **(paragraph no(s). [0034], the "reference value" is interpreted as a predetermined threshold)**.

Fordahl discloses a device from the same field of endeavor as the subject matter of the application, wherein the lens moves according to specified control functions and

predetermined thresholds as described above. It would have been obvious to a person having an ordinary level of skill in the art at the time the invention was made to include the lens movement and control functions disclosed by Fordahl with the method and apparatus disclosed by Fukuyo, such that the movement of the lens occurs after forming the modified region in the one end part, in order to keep the measurement beam operational during machining operations **(Fordahl at paragraph no(s). [0005])**.

16. Claims 8, 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukuyo in view of Fordahl, and further in view of U.S. Patent No. 5,122,648 to Cohen et al. (hereinafter "Cohen").

Fukuyo and Fordahl show all the features of the claimed invention as set forth above, including releasing of the lens from the initial position in the processing step, wherein the displacement acquiring means also acquires the quantity of reflected light of the second laser beam; wherein the control means sets the initial position according to the displacement at a location; and wherein the control means controls the holding means so as to release the lens from being held at the initial position. The combination of Fukuyo and Fordahl fails to disclose, teach or suggest that the control thresholds for these functions is after an amount of change in the quantity of reflected light becomes a maximum or extreme value. Cohen discloses control after an amount of change in the quantity of reflected light becomes a maximum or extreme value **(col. 10, lines 54-61)**.

Cohen discloses a device from the same field of endeavor as the subject matter of the application, wherein the control threshold is when a quantity of reflected light

becomes a maximum or extreme value. It would have been obvious to a person having an ordinary level of skill in the art at the time the invention was made to replace the control thresholds disclosed by the combination of Fukuyo and Fordahl with the control threshold(s) disclosed by Cohen in order "to effectuate automatic focusing" **(Cohen at col. 10, lines 46-50)**.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP 2000-306865 and JP 6-190578 disclose sensing the intensity of a reflected second laser beam to identify contours of a workpiece. U.S. Patent No. 6,411,838 discloses sensing the intensity of a reflected illuminating light to identify contours of a tissue sample. U.S. Pat. App. Pub. No. 2004/0206882 discloses image focus control upon reaching a predetermined threshold in the rate of change of intensity of light reflected from a tissue sample. U.S. Patent No. 4,944,922, U.S. Patent No. 5,017,796, U.S. Patent No. 5,594,235 and U.S. Patent No. 6,353,216 each disclose control based upon a maximum in the intensity of light reflected from a target.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARK WOODALL whose telephone number is (571)270-3033. The examiner can normally be reached on Monday to Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on (571) 272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MARK WOODALL/
Examiner, Art Unit 3742

/Geoffrey S Evans/
Primary Examiner, Art Unit 3742